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17. ABSTRACT (MAX. 250 WORDS)

The purposes, curriculum structure, teacher's role, and types of programs in English, science, mathematics, and history in a nongraded high school are described. The purpose of the nongraded organization is to shift the responsibility for learning from the school to the student. Courses are selected by the students, who are advised to choose courses in line with their achievements and aspirations.

The curricular structure is based on five phases, or ranges of achievement levels, to accommodate the very slow, slow, average, superior, and exceptional students. In the first achievement phase, special assistance is given in small classes. In the second phase, basic skills are emphasized. The third phase provides learning experiences for average students. The fourth phase deals with the same areas but in greater depth. In the fifth phase, students assume complete responsibility for their learning and take college level courses. In an additional phase, classes are nongraded; in still another, students are permitted to research an area of special interest for one to three hours a day under the supervision of a faculty member.

The teacher's role is to lead students to acts of discovery that constitute learning. Such passive learning experiences as lectures occupy a maximum of twenty percent of the time, the balance being divided between small group discussions and individual research on questions proposed by the teacher.

Facilities and equipment provide opportunities for flexible teaching. Technological devices like overhead projectors, amplifying systems, tape recorders, and headphones facilitate large classes.

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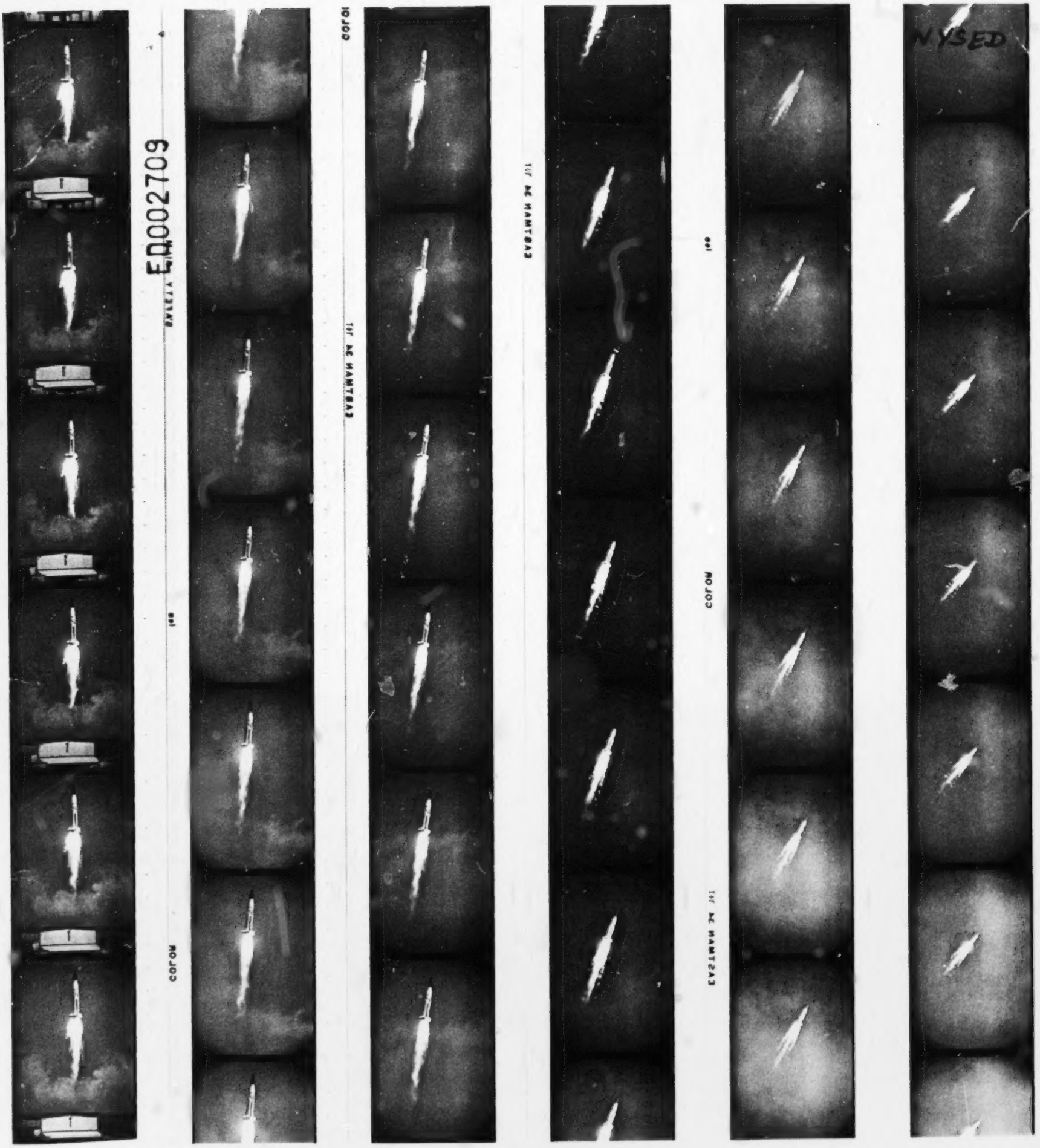

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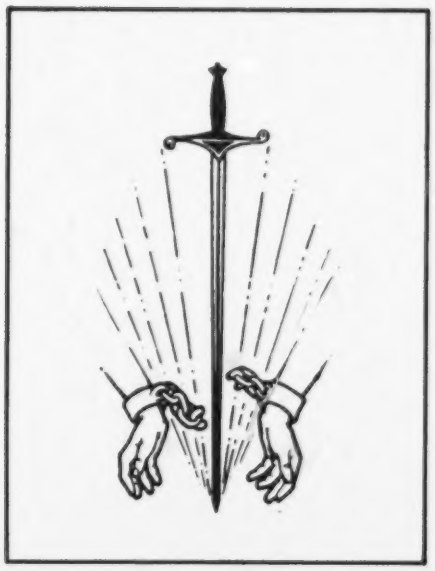
EDO02709 SPACE AGE PROGRAMMING

melbourne high school

CURRICULUM PROSPECTUS NO 4
THE NONGRADED PROGRAM



BREAKING THE LOCKSTEP

The intent of a mobile curriculum is to shift the responsibility for learning from the school to the student.

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education

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This bulletin was prepared by the Melbourne High School instructional staff. Special thanks are due to Margaret Coffin, Janet Kennedy and Pat Lutterbie.

COVER STORY
ACTUAL TRACKING FILM STRIPS FROM MOTION PICTURE FILM OF SATURN SA-5 LAUNCH FROM CAPE CANAVERAL. PRECISION TRACKING EQUIPMENT DESIGNED AND MANUFACTURED BY BARNES ENGINEERING COMPANY. COVER PHOTOS COURTESY OF BARNES ENGINEERING COMPANY.

To the students of Melbourne High School who are becoming mentally invincible as they learn at a rate compatible with their potential.

DESIDERATA

The purpose of education is to prepare individuals to make wise choices. The opportunity to consider and arrive at important decisions vitally affecting the future of the individual is reflected in the school's schedule of course offerings.

Each student is encouraged to study carefully the school's organization and programs of studies, and to phase himself in line with his past achievement and present resolve. We urge that no student enroll in courses phased below his intellectual potential, but this is a student's prerogative as well as a student's responsibility — only the individual suffers from the consequences of not having been educated to his maximum potential.

One of the great mistakes that students make is to think of education only in terms of formal schooling. Each student is encouraged to regard learning as a process which begins at birth and ends only with death and is by no means limited to the classroom.

In keeping with this philosophy students will find the library and laboratories open longer than in most schools. Private arrangements can be made by responsible students working on special projects to gain access to creative art of science laboratories even beyond the late afternoon and evening hours when these facilities are generally available.

PHASED LEARNING

The structure of the curriculum augurs that students phase themselves on the basis of accomplishment in individual courses. The architecture for this new organization is composed of five verticals of learning.

Phase I	Phase II	Phase III	Phase IV	Phase V
Achievement Range 0 to 20th Percentile	Achievement Range 20th to 40th Percentile	Achievement Range 40th to 60th Percentile	Achievement Range 60th to 80th Percentile	Achievement Range 80th to 99th Percentile

The specifications for the curriculum which result from this arrangement for learning are:

Phase I — learning arrangements designed for students who need special assistance in small classes.

Phase II — learning situations planned for students who need more emphasis on the basic skills of a subject.

Phase III — learning circumstances arranged for students who have an average background of achievement in the subject area.

Phase IV — a lively milieu geared to challenge extremely well prepared students desiring education in depth.

Phase V — a learning situation in which students assume complete responsibility for their own learning and pursue college level courses while still in high school.

Phase X — classes which are nongraded but are not phased for mobility.

Phase Q — a nongraded component designed to give thrust to the notion of individual fulfillment. In this phase a student may detour from the conventional class instruction at any point and research an area in which he is deeply and broadly curious. The intent is to allow students to develop creative powers or quest for special knowledge. A student may spend from one to three hours a day in Phase Q.

The purpose of the phased learning arrangement is to provide an innovative curriculum which is linked to what the student actually knows rather than what he is assumed to know because he has been promoted to a particular grade.

THE NEW ROLE OF THE TEACHER

In the past the high school curriculum has been fact centered. This type of curriculum demanded that the teacher dominate the classroom and play the central role in the drama of teaching. More often than not he lectured most of the time. This mode of teaching is now considered to be disfunctional and the role of the teacher as a lecturer and dispenser of knowledge is inappropriate both to new subject matter and to modern theories of learning.

The best arrangement for learning prevails when students are involved as participants rather than as listeners. Modern methods of teaching recognize that passive learning experiences such as teacher lecturing and student listening should not occupy more than wenty percent of the total time involved in a course. (Twenty percent is an absolute maximum for time spent in lecturing and information giving.) Approximately forty percent of the time should be planned so that students will be engaged in critical analysis in small group discussions. (The most efficient size group for viable discussion is from five to eight students.) In the remaining forty percent of the course time students should be deeply involved in some type of individual learning.

Epitomized, new developments in the curriculum have changed the function of the teacher. Instead of the teacher's controlling the classroom by asking questions to which he has pat answers, his task is to develop profound questions which revolve around the major themes that hold the subject together. These questions should be carefully designed to encourage students to search and quest on their own. Exciting questions proposed by the teacher are tackled in a balanced program of small group discussions and individual research. The intent is to make the process of learning the act of discovery.

Heuristic Learning

Not nearly enough has been written or said about the lost art of learning through discovery. The Greeks knew this approach to learning well. They referred to it as heuris (kein), meaning, to find and observe. The modern term heuristics refers to "discovery learning."

The new curricula which are being developed by the nation's most able scholars are based upon the major principles of the subject — the great themes which tie the discipline together. With this type of material the approach to learning becomes a problem solving or conceptual rather than a fact centered approach. The intent is to have students learn through discovery. New components built into a curriculum, centered around the major principles of a discipline, are bringing about a radical change in the role which the teacher plays in the learning process. The teacher becomes a kind of devil's advocate, needling students to search and discover for themselves.

The prerequisites for learning through discovery are possessed by students in varying degrees. The components of this type of learning are an insatiable curiousity and a determination to express oneself as an individual. In heuristic learning, the role of the teacher changes as he becomes the catalyst in the learning process. His function is to excite students to the point where they will seek to discover and learn on their own. Provided with the gantry and the initial launch, students acquire the impetus for staging and landing their own discovery learning projects.

The heuristic approach to learning should become an integral part of all disciplines; it is not exclusively the prerogative of the scientist. In every discipline students must be encouraged to make shrewd guesses and take intuitive leaps to tentative conclusions.

THE ENGLISH CURRICULUM

English is the most important subject in the curriculum. Skill in the art of reading and communication is basic to an understanding of all other disciplines. Before phasing himself in this significant subject, each student is urged to make a conscientious self-analysis of his past achievement in English. With knowledge in all fields expanding at a remarkable rate, and with competition growing keener for the better positions in the business and professional worlds, each student should carefully reassess his English accomplishment, especially in the area of reading. Students who do not read efficiently should, by all means, register for a course in the improvement of reading.

The English Laboratory Concept

When a student reaches high school and still has serious learning deficiencies, it is apparent that the self contained classroom is not an effective physical environment. Students who have learned with difficulty in the lower schools must overcome and defeat long standing frustrations before their rate of learning can be accelerated.

Through its commitment to the nongraded notion MHS has attempted to meet special problems of learning by providing a varying curriculum in a different setting for students with diverse abilities. The effort to teach reluctant learners has resulted in the development of special laboratories with a new and changed atmosphere. These laboratories have been air conditioned for increased comfort and carpeted for improved acoustics and general appearance. They have been furnished for comfort and relaxation. The mood of the program which is operated in laboratory learning situations has been deliberately made easy going and harmonious. The removal of pressure for learning and the resulting loss of tension pays dividends in lengthening students' attention span and heightening their desire to progress.

The English laboratory which is concerned almost entirely with reading is staffed with selected teachers who are especially interested in the problems of hesitant learners. Both Phases I and II of English are designed as laboratory courses.

Students with serious deficiencies in reading are scheduled into the Phase I English course which meets for two hours daily. This course is organized around the primary skills of reading. The concentration is largely concerned with the development and improvement of minimal reading skills.

The Phase II curriculum is intended to further improve and increase the development of basic reading skills. Students in this phase do a surprising amount of free reading in their effort to meet minimum standards for reading.

Phase III English courses are designed to accommodate average students. In order to provide variety of instruction and, at the same time, proliferate teacher talent among all students, these classes are taught in cycles. In the cycle approach, course content is divided into four major components with a single teacher becoming a specialist in either drama, poetry, the novel, or the essay and short story. Under this plan students are scheduled into a new aspect of English and a new teacher each nine weeks.

The Phase IV curriculum is available to students who earn marks at the A or B level and are able to tackle heavier assignments and more challenging work. In this phase the approach varies with the teacher. The individual teacher may base his teaching upon concepts of genre, theme, or chronology. Depth rather than breadth is the aim in Phase IV classes. Writing experiences are heavily stressed in this phase. In composition, the emphasis is first on clear exposition, then on the niceties of style. Paperback books provide a variety of literary samples and eventually form the nucleus of student libraries.

Phase V, which consists of college level English, is available for extremely well-prepared, able students. Individuals delve into extremely difficult selections and are responsible for wide "outside" reading as well as scholarly research projects.

In conventionally graded schools, the sequence in English is apt to be: American literature in tenth grade, English literature in the eleventh and World literature in the twelfth. In the effort to develop a more flexible situation, all students at MHS studied World literature in 1963: they are studying English literature in 1964, and will study American literature in 1965. This arrangement provides an easy vehicle for re-phasing students at any time of the year. Students who are up-phased are not required to adjust to entirely new learning situations but to increased depth in a previously studied area.

In every phase the emphasis is on:

1. The presentation of lively and meaningful literature.
2. Written expression appropriate to the individual.
3. Improvement in oral expression.

THE SCIENCE CURRICULUM

All of the science courses at MHS are based upon course content which has been developed within the last five years. Almost without exception the materials in use have been written by teams of great scientists and scholars. Textbooks written by one man have been discarded along with the traditional course design which emphasized boxed arrangements and key points of a chapter.

The science curriculum is based largely upon the B.S.C.S. materials in biology, Chem Study in chemistry, and P.S.S.C. in physics. The Princeton Science Project is utilized to accommodate the special needs of reluctant learners in science.

In each science class, the course content receiving the most stress clusters around the great themes which tie the subject together. All science courses are structured to take advantage of a multichanneled rather than a single approach. In the words of a student:

> "You do laboratory work almost every day and are allowed to draw your own conclusions. You learn on your own rather than through getting something directly from the book or the teacher."

Laboratory work is the major vehicle of learning in all science courses.

The greater part of each course is buttressed by thematic concepts. Considerable attention is paid to intuitive learning in the laboratory. Experiments utilize the heuristic approach by which students acquire understanding through searching and discovering for themselves. Although science courses have long been considered profitable only for bright students at MHS, just as much attention is given to science courses for hesitant learners as for their more advanced classmates. The degree of detail covered by experiments and laboratory work in such courses is determined by the achievement level of the students.

Because of their concentration on the problems of hesitant learners, two courses in the science department are of particular interest. The Time, Space and Matter course used with Phase II physical science students was developed at Princeton University. This course guides reluctant high school learners in their discovery of the basic concepts of scientific theory. Students work mostly on laboratory experiments in their search for the basic principles of science and an understanding of its practical applications.

Diffident learners in the biological sciences use the Biological Sciences Curriculum Study Special Materials Program for Slow Learners. (It is regrettable that the B.S.C.S. headquarters has saddled this bright new heresy with such an unimaginative title.) Biology for half hearted learners has been set up specifically for science students achieving in the lower 30%. Emphasis is on the basic themes and principles of biology with the realization that the degree of detail must necessarily be less than in the average biology classes. Laboratory work is stressed although care is taken to keep the reading level and length of assignments within the grasp of the slow student.

At the other end of the spectrum a science research program is available for Phase Q students. Quest students delve deeply into individual research in the areas of biology, physics, physical chemistry, and bio-chemistry. In addition to the one period each day devoted to science research, students in this program are obligated to participate in extended laboratory periods of at least four hours each week.

THE MATHEMATICS CURRICULUM

The broad functions of the mathematics curriculum are designed to kindle excitement and feeling for the intuitive use of mathematics. The approach is through instruction and experience in logical reasoning. The intent is to foster an appreciation for pure mathematical structure and deductive reasoning. The mathematics department is concerned that the student understand what he is doing as opposed to the conventional programs in which students memorize and feed-back. The result is that drill work is not stressed but proficiency in manipulation is gained through its use in relation to concepts and through the solution of stimulating problems.

The school encourages a depth curriculum in mathematics designed to give students a sophisticated background in algebra, plane and analytic geometry, trigonometry, and a basic understanding of calculus, probability and statistics theory. A second year's work in calculus is available as independent study on advanced mathematics topics. The question arises as to how a student can cover so much in his high school years. High ability students with good backgrounds in mathematics can complete this course of study by completing two mathematics courses in one year. Especially convenient doublings are algebra II and geometry, trigonometry and algebra II, or advanced calculus and probability-statistics.

In the basic mathematics classes instruction centers around problem solving, collecting and organizing data, analyzing the problem rationally, and following through to the solution. Relating arithmetic to the real or physical world is as important to half hearted mathematics students as the notion of stressing an intuitive understanding of concepts for the advanced. Here again arithmetic drill for its own sake is discouraged since it tends to diminish enthusiasm and interest in the class and to impede any real progress in the learning of mathematics.

In all phases of the mathematics curriculum students are given the opportunity to discover, analyze and solve for themselves. The teacher's role is to guide the student into these discoveries.

THE HISTORY CURRICULUM

The principal aim of the history department is to stimulate active individual perception on the part of every student and to encourage imaginative inquiry and genuine concern for the historical processes which have caused the present world crises.

In order to accomplish this, the history department has discarded, as ineffectual and inefficient, the traditional concept that history must be taught chronologically. The MHS history staff is convinced that the most challenging and intelligent approach is the presentation of current affairs within a historical framework.

In American History, for example, students are given an opportunity to probe deeply into the principles of liberty, equality, justice and self-government. During each of the quest periods students are guided by a master teacher in one of the thematic areas of Foreign Policy and Social History, Communism and the United States Constitution, Americans and Self-Government, and the Dual Impact of Automation and Cybernation on American Traditions. Just as in English the cycle approach is employed as the vehicle of instruction, students change topics and teachers each nine weeks. To insure greater phasing flexibility, World History and American History are taught on an alternating basis with American History being the subject for concern one year and World History scheduled for the next year.

Since students need an understanding of the rapid political shifts in today's world, a new research and discussion course dealing exclusively with International Affairs is available. In this course students first, test the validity and adequacy of Dr. Saul Mendlevitz's five "models" (The Protracted Conflict, The Bi-Polar, The Regionalism, The Polyeentri.m, and The Clark-Sohn revisions of the United Nations Charter). Next, students are encouraged to attempt the creatior. of new models in the search for world peace. They are further challenged to choose individual research problems involving present world crises and conflicts and after having used the solutions suggested by Dr. Mendlevitz, to come to some definite conclusions about feasible peace systems.

FLEXIBLE TEACHING

Flexible use of classroom areas coupled with elasticity in the teacher-student ratio have made possible a more efficient, economic and individualized system of classroom instruction.

Through the use of technological devices the staff at MHS has found it convenient in some areas for one teacher to give vigorous, effective instruction to large groups varying in size from 60 to 125 students. This approach is highly effective in the specific areas of typing, shorthand, and drawing. In order to learn these subjects students must be personally involved 90% of the time. Consequently, they need occupy no more than 10% of their classroom time receiving instructions. Typing students respond agreeably to classes of 125 or more. Art is efficiently taught to classes of 100. In the teaching of shorthand, four tape recorders with numerous outlets and headphones for each student are being used. With this approach, it has become possible to increase class size to 60 students and at the same time let each student learn at an individual rate, progressing from one dictation speed to another without the pressure of having to keep up with the class.

In large group instruction overhead projectors are used in lieu of blackboards for the presentation of instructional material. Amplifying systems make it possible for all students to understand instructions clearly and correctly.

By increasing teacher loads in some areas, it has been possible to reduce the teaching load in those classrooms where it is highly desirable for the students to have constant teacher supervision either because of the complexity of the subject being taught or because of special needs of the students. For instance, since one typing teacher instructs 125 students at a time, three other teachers are released to reduce class size for students who have learning difficulties in one of the major disciplines.

EDUCATION BY APPOINTMENT (Phase Q)

In addition to the breakdown of subject matter into five phases, MHS offers a program designed to (1) provide creative learning experiences (2) allow students to probe deeply into an area of interest. This aspect of the program permits students to detour from the conventional paths of learning.

In Phase Q the responsibility for the area of study is left entirely up to the individual student. Each student chooses his own project, question, or approach to a subject. He presents it, along with a general plan of investigation, to the Quest Co-ordinator, secures a faculty member as a consultant, and begins work. The quest student is responsible for the entire project from its conception through the investigation and evaluation stage. A quest student is expected to meet with his consultant at least once each week and with the program co-ordinator whenever necessary. The student, in effect, receives his education by appointment rather than through a formal class.

In order to qualify for this program, students must have a B average in previous work related to their chosen research, a clearly defined area of study, and a plan for initial investigation.

THE SPIN OUT

There can be no final summing up of the program at MHS for there is never a time when conditions are static. There is constant mobility as teachers become aware of new and significant concepts within their subject areas and use newly discovered ideas to reinforce existing teaching techniques.

There is an aura of adventure as whole new departments are created to fit the burgeoning needs of students in order that they might meet the ever-changing social and technological demands of this century. A fine arts department is now being evolved since it is becoming more and more apparent that one of the functions of education should be to assist students in the wise use of leisure time now that we are approaching an age in which every individual will have large chunks of disposable leisure time. The aim of the fine arts department is to assist in the cultural development of students, making it possible for them to develop their imaginations toward the discovery of personal talents and abilities. Dedicated to the idea that students should be able to express themselves in the areas of music, humanities, art and other related creative fields, the intent of the fine arts department is to spur students toward greater intellectual refinement.

New concepts of education automatically spin-out old notions as students, parents and teachers become aware of the validity of new ideas and thrust aside archaic patterns and standards. This spinning-out process can be clearly seen this year in changes in the physical education department. The established curriculum of physical education which is chiefly field sports has never jived with the needs of the female students. For this reason, an experimental course in interpretative dance is being offered. It has become apparent that while this is an art form which demands vigorous activity, physical flexibility, coordination and great muscular control, it has enormous appeal for female students. Student enthusiasm has become so intense that the traditional athletic program for girls is spinning out. It is being replaced by a depth program in interpretative dance.

The story of Melbourne High School this year will not be the story of Melbourne High School next year because as soon as a program is working well there is always the challenge to improve it, to refine it, and make it obsolete.

"RESEARCH
IS A HI-HAT
WORD THAT SCARES
A LOT OF PEOPLE. IT NEEDN'T.
IT IS A NOTHING BUT A STATE OF
MIND---A FRIENDLY WELCOMING
ATTITUDE TOWARD CHANGE.
IT IS THE PROBLEM
SOLVING MIND AS
CONTRASTED WITH
THE LET-WELL
ENOUGH ALONE
MIND. IT IS
THE TOMORROW
MIND INSTEAD OF THE
YESTERDAY MIND."

C.F.KETTERING

MELBOURNE HIGH SCHOOL

Where Imagination is as Important as Knowledge